WHAT IS CLAIMED IS:

1. A computer system in which data required to transmit a bus transaction is transmitted between first and second controllers which are connected to first and second buses, said computer system comprising:

means for transmitting a plurality of items of data from said first controller to said second controller without waiting for a return of an affirmative response from said second controller, each of the transmitted items of data having consecutive identifier numbers;

means for returning a response from said second controller to said first controller when said second controller correctly receives an item of data, the response having an identifier number corresponding to the received item of data; and

means for managing whether or not the response is returned from said second controller to said first controller for each of the transmitted items of data and re-transmitting an item of data waiting for the return of the response from said first controller to said second controller in order of the identifier numbers when a re-transmission request is transmitted from said second controller to said first controller.

2. The computer system according to claim 1, wherein said second controller transmits the re-transmission request to said first controller when data

cannot be received or when the identifiers of the received items of data are not consecutive.

3. The computer system according to claim 1, further comprising error recovery means for, when an error occurs during data transfer between said first and second controllers, transmitting a predetermined bit pattern between said first and second controllers, thereby reestablishing synchronization between said first and second controllers, notifying to said first controller an identifier number of an item of data from which transmission is to be restarted, and returning said first and second controllers to a normal operation state, and wherein said data transmitting means restarts transmission processing from the item of data having the notified identifier number.

4. The computer system according to claim 3, wherein said first controller detects that an error has occurred during data transfer between said first and second controllers when an identifier of the returned affirmative response is not consecutive.

5. The computer system according to claim 1, wherein said first controller is provided at a host device and said second controller is provided at an expansion unit for increasing a function of said host device, and said first and second controllers function as a single bridge device for connecting said first and second controllers via a serial transmission path.

6. A computer system in which data required to transmit a bus transaction is transmitted between first and second controllers which are connected to first and second buses, said computer system comprising:

5   means for transmitting a plurality of items of data from said first controller to said second controller without waiting for a return of a response from said second controller, each of the transmitted items of data having consecutive identifier numbers;

10   means for returning a response from said second controller to said first controller every time said second controller correctly receives an item of data, the response having an identifier number corresponding to the received item of data; and

15   means for managing whether or not the response is returned from said second controller to said first controller for each of the transmitted items of data and causing said data transmitting means to repeatedly execute consecutive transmission processing in units of

20   the plurality of items of data including an item of data waiting for the return of the response from said second controller.

7. The computer system according to claim 6, further comprising error recovery means for, when an

25   error occurs during data transfer between said first and second controllers, transmitting a predetermined bit pattern between said first and second controllers,

thereby reestablishing synchronization between said

first and second controllers, notifying to said first

controller an identifier number of an item of data from

which transmission is to be restarted, and returning

5   said first and second controllers to a normal operation

state, and wherein said data transmitting means

restarts transmission processing from the item of data

having the notified identifier number.

8.   The computer system according to claim 7,

10 wherein said first controller detects that an error has

occurred during data transfer between said first and

second controllers when an identifier of the returned

affirmative response is not consecutive.

9.   The computer system according to claim 6,

15 wherein said first controller is provided at a host

device and said second controller is provided at an

expansion unit for increasing a function of said host

device, and said first and second controllers function

as a single bridge device for connecting said first and

20 second controllers via a serial transmission path.

10.   A computer system comprising a host device, an

expansion unit for increasing a function of said host

device, and a bridge device including a first

controller provided at the host device and a second

25 controller provided at said expansion unit, said first

and second controllers functioning as a single bridge

device for connecting said first and second controllers

via a serial transmission path, each of said first and
second controllers comprising:

means for transmitting a plurality of items of
data without waiting for a return of a response, each

5   of the transmitted items of data having consecutive
identifier numbers;

means for returning a response every time
correctly receiving an item of data, the response
having an identifier number corresponding to the

10 received item of data; and

means for managing whether or not the response is
returned for each of the transmitted items of data and
re-transmitting an item of data waiting for the return
of the response in order of the identifier numbers when

15 a re-transmission is requested.

11.   A computer system comprising a host device, an
expansion unit for increasing a function of said host
device, and a bridge device including a first
controller provided at the host device and a second

20 controller provided at said expansion unit, said first
and second controllers functioning as a single bridge
device for connecting said first and second controllers
via a serial transmission path, each of said first and
second controllers comprising:

25 means for transmitting a plurality of items of
data without waiting for a return of a response, each
of the transmitted items of data having consecutive

identifier numbers;

means for returning a response every time correctly receiving an item of data, the response having an identifier number corresponding to the
5   received item of data; and

means for managing whether or not the response is returned for each of the transmitted items of data and causing said data transmitting means to repeatedly execute consecutive transmission processing in units of
10   the plurality of items of data including an item of data waiting for the return of the response.

12. A computer system comprising:

means for transmitting a plurality of items of data without waiting for a return of a response, each
15   of the transmitted items of data having consecutive identifier numbers; and

means for returning a response every time correctly receiving an item of data, the response having an identifier number corresponding to the
20   received item of data, and

wherein data transmission and the return of the response are performed asynchronously.

13. A data transfer control method for a computer system in which data required to transmit a bus
25   transaction is transmitted between first and second controllers which are connected to first and second buses, said method comprising the following steps of:

transmitting a plurality of items of data from said first controller to said second controller without waiting for a return of a response from said second controller, each of the transmitted items of data

5 having consecutive identifier numbers;

returning a response from said second controller to said first controller every time said second controller correctly receives an item of data, the response having an identifier number corresponding to

10 the received item of data; and

managing whether or not the response is returned from said second controller to said first controller for each of the transmitted items of data and re-transmitting an item of data waiting for the return of

15 the response from said first controller to said second controller in order of the identifier numbers when a re-transmission request is transmitted from said second controller to said first controller.

14. A data transmission control method for a

20 computer system in which data required to transmit a bus transaction is transmitted between first and second controllers which are connected to first and second buses, said method comprising the following steps of:

transmitting a plurality of items of data from

25 said first controller to said second controller without waiting for a return of a response from said second controller, each of the transmitted items of data

having consecutive identifier numbers;

returning a response from said second controller to said first controller every time said second controller correctly receives an item of data, the response having an identifier number corresponding to the received item of data; and

managing whether or not the response is returned from said second controller to said first controller for each of the transmitted items of data and causing said data transmitting means to repeatedly execute consecutive transmission processing in units of the plurality of items of data including an item of data waiting for the return of the response from said second controller.

15. A data transmission control method for a computer system comprising the following steps of:

transmitting a plurality of items of data without waiting for a return of a response, each of the transmitted items of data having consecutive identifier numbers; and

returning a response every time correctly receiving an item of data, the response having an identifier number corresponding to the received item of data, and thereby performing data transmission and the return of the response asynchronously.

16. A transmitting apparatus comprising:

means for sending a plurality of items of data

having identifier numbers;

means for checking the identifier numbers of the sent items of data; and

means for receiving a response indicating a

5   reception of the sent items of data,

wherein said sending means sends another plurality of items of data having identifier numbers following the identifier numbers checked by said checking means, when said receiving means receives the response.

10   17.   A transmitting method comprising the following steps of:

sending a plurality of items of data having identifier numbers;

checking the identifier numbers of the sent items

15 of data;

receiving a response indicating a reception of the sent items of data; and

sending another plurality of items of data having identifier numbers following the identifier numbers

20 checked by said checking step when the response is received.

18.   A transmitting apparatus comprising:

means for sending a plurality of items of data having identifier numbers; and

25   means for receiving a response indicating a non-reception of the sent items of data and an identifier number to be re-transmitted,

wherein said sending means sends an item of data having the identifier number indicated by the response.

19. A transmitting method comprising the steps of:

sending a plurality of items of data having identifier numbers;

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receiving a response indicating a non-reception of the sent items of data and an identifier number to be re-transmitted; and

sending an item of data having the identifier number indicated by the response.

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